

WHAT IS CLAIMED IS:

1. A method for producing Ti or Ti alloys through reduction by Ca, comprising:
  - a Ca generation step by Na introduction, in which Ca is generated by introducing Na into molten salt containing CaCl<sub>2</sub>, the molten salt being kept at temperatures of not more than 600 °C;
  - a Ti generation step by a reducing reaction, in which Ti or a Ti alloy is generated in said molten salt by supplying metallic chloride containing TiCl<sub>4</sub> into said molten salt to cause the metallic chloride to react with Ca generated in said molten salt; and
  - a Ti separation step in which said Ti or Ti alloy generated in said molten salt is separated from said molten salt.
2. The method for producing Ti or Ti alloys through reduction by Ca according to claim 1, wherein the Ca generation step by Na introduction and the Ti generation step by the reducing reaction are performed in the same reactor apparatus.
3. The method for producing Ti or Ti alloys through reduction by Ca according to claim 1, further comprising an electrolytic step in which Na is generated by electrolyzing the molten salt containing NaCl, wherein Na generated in the electrolytic step is introduced into said molten salt.
4. The method for producing Ti or Ti alloys through reduction by Ca according to claim 3, wherein the molten salt is held at temperatures of more than 600 °C in said electrolytic step.
5. The method for producing Ti or Ti alloys through reduction by Ca according to claim 3, wherein the molten salt separated from said Ti or Ti alloy is supplied to said electrolytic step.
6. The method for producing Ti or Ti alloys through reduction by Ca according to claim 3, further comprising a chlorination step in which TiCl<sub>4</sub> is generated by causing a Cl<sub>2</sub> gas to react with TiO<sub>2</sub>, the Cl<sub>2</sub> gas being of

by-product in association with said electrolysis, wherein  $TiCl_4$  generated in the chlorination step is used for the generation reaction of said Ti or Ti alloy.

7. The method for producing Ti or Ti alloys through reduction by Ca according to claim 5, further comprising a Na separation step, in which a 5 temperature of the molten salt separated from said Ti or Ti alloy is increased to be more than 600 °C to generate Na before the molten salt is supplied to said electrolytic step, and said molten salt is introduced to the electrolytic step after the generated Na is separated and removed.

8. The method for producing Ti or Ti alloys through reduction by Ca 10 according to claim 7, wherein the Na separation step also doubles as said Ti separation step.

9. The method for producing Ti or Ti alloys through reduction by Ca according to claim 1, wherein said molten salt containing  $CaCl_2$  is a mixed molten salt containing  $CaCl_2$  and  $NaCl$  at a ratio in which a melting point 15 becomes not more than 600 °C.

10. The method for producing Ti or Ti alloys through reduction by Ca according to claim 9, wherein said mixed molten salt is a mixed molten salt containing at least one of  $KCl$ ,  $LiCl$ , and  $CaF_2$  at a ratio in which a melting point becomes not more than 600 °C.

20 11. The method for producing Ti or Ti alloys through reduction by Ca according to claim 1, wherein said metallic chloride containing  $TiCl_4$  is a mixture containing  $TiCl_4$  and another metallic chloride.

12. The method for producing Ti or Ti alloys through reduction by Ca according to claim 1, wherein the generated Ti or Ti alloy is particulate 25 whose particle diameter ranges 0.5 to 50  $\mu m$  on an average.

13. The method for producing Ti or Ti alloys through reduction by Ca according to claim 1, wherein a Ca concentration is managed to be not lower than 0.01% in the molten salt used in said Ti generation step.